

What is claimed is:

1. A method of fabricating a fused optical fiber component comprising:

fabricating a billet having a signal receiving end and a signal emitting end and including a plurality of fused optical fibers extending generally along a longitudinal axis between the signal receiving and signal emitting ends;

reducing the diameter of the billet along a portion of the length of the billet so as to form a shoulder having a predetermined contour;

providing a first billet-surrounding member adapted for sliding axially over one end of the billet and arresting engagement by the shoulder;

providing a second billet-surrounding member adapted for sliding axially over the billet and having a predetermined interior contour adapted to fit over and contactably engage at least a portion of the length of the first billet-surrounding member;

sliding the first billet-surrounding member over one end of the billet and bringing it into contacting engagement with the shoulder of the billet and sliding the second billet-surrounding member over the billet, the first and second billet-surrounding-members being slid over the billet one of (i) simultaneously and (ii) first member first and second member second;

urging the first and second billet-surrounding members toward the shoulder; and

heating the billet and the first and second billet-surrounding members to a softening temperature sufficient to fuse the first billet-surrounding member to the billet and the second billet-surrounding member to the first billet-surrounding member so as to form a single, fused component.

2. The method of claim 1 further comprising at least one of (i) grinding and (ii) polishing the single piece to a predetermined profile.

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3. The method of claim 1 wherein the first billet-surrounding member comprises frit.
4. The method of claim 3 wherein the frit is devitrifying frit.
5. The method of claim 1 where in the billet, the first billet-surrounding member and the second billet-surrounding member are comprised of glass.

6. A method of fabricating a fused optical fiber component comprising:

fabricating a billet having a signal receiving end and a signal emitting end and including a plurality of fused optical fibers extending generally along a longitudinal axis between the signal receiving and signal emitting ends, each optical fiber including a core and a cladding, the cladding being formed from a first material;

reducing the diameter of the billet along a portion of the length of the billet so as to form a shoulder having a predetermined contour;

providing a first ring adapted for sliding axially over one end of the billet and arresting engagement by the shoulder, the first ring being formed from a second material;

providing a second ring adapted for sliding axially over the same end of the billet as the first ring and having a predetermined interior contour adapted to fit over and contactably engage at least a portion of the length of the first ring, the second ring being formed from a third material;

sliding the first ring over one end of the billet and bringing it into contacting engagement with the shoulder of the billet and sliding the second ring over the same end of the billet as the first ring, the first and second rings being slid over the end of the billet one of (i) simultaneously and (ii) first ring first and second ring second;

urging the first and second rings toward the shoulder; and
 heating the billet and the first and second rings to a softening temperature
 sufficient to fuse the first ring to the billet and the second ring to the first ring so
 as to form a single piece.

7. The method of claim 6 wherein at least one the following conditions is met:

- (i) the first, second and third materials are the same material;
- (ii) at least two of the first, second and third materials are the same material;
- (iii) at least one of the first, second and third materials is different than the other two materials and the first, second and third materials have compatible softening temperatures and thermal expansion coefficients.

8. A method of fabricating a fused optical fiber component having a predetermined profile comprising:

fabricating a billet having a signal receiving end, a signal emitting end and an outer surface extending between the signal receiving and signal emitting ends, the billet further including a plurality of fused optical fibers extending generally along a longitudinal axis between the signal receiving and signal emitting ends, each optical fiber including a core and a cladding;

providing an elongated billet-surrounding member adapted to at least partially surround the billet and having an inner surface and an outer surface;

placing at least a portion of the outer surface of the billet in contact with at least a portion of the inner surface of the elongated billet-surrounding member;

heating the elongated billet-surrounding member and the billet to a temperature sufficient to fuse the elongated billet-surrounding member to the billet; and

grinding the outer surface of the elongated billet-surrounding member to the predetermined profile.

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